

SPECIAL SPECIFICATION

SECTION 16601S

IONIZATION SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Air ionizers installed to reduce static charges of all exposed surfaces in wafer fab. Ionizers on HEPA channel ceiling grid to cover all process areas of wafer fab and air shower. The ionization system shall be a complete operational system.

1.02 DESIGN CRITERIA

- A. Static Charge: Absolute value not to exceed 150 volts for all 100% ULPA covered areas in accordance with manufacturer's specifications. Contractor to confirm quantity of emitters and controllers required to meet specifications. Ceiling heights are typically 12'. Average laminar airflow equal to or greater than 75 FPM.

1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Ion Concentration: will be capable of producing average ion levels of at least 200,000 ions per cubic centimeter of both polarities measured with a non-field sensitive ion counter at work level (36-inches from the floor) beneath the ion emitter.
- B. Maximum Potential Swing: The maximum potential swing in each identified zone shall not exceed 150 volts peak as measured by the charged plate method at work level. This swing shall be less than 100 volts where airflow and ceiling height allow section 1.3 C. to be met.
- C. Average Discharge Time: Using a Charged Plate Monitor, at a height of 36," the average discharge time in each identified zone from 100 percent to 10 percent (1,000 volts to 100 volts) shall be as follows (where laminar flow is a minimum of 70FPM):
 - 1. Maximum discharge time < 45 seconds
- D. Polarity Balance Stability: System must have a proven history of inherent polarity balance stability over time.
- E. Particle Generation: Particle generation measured at bench top level shall meet or exceed Class 1 specifications.
- F. Ozone Generation: Total accumulated ozone generation shall be four parts per billion or less when measured in a sealed 1,000 cubic foot chamber over a 24 hour period.

- G. EMI/RFI Generation: The generation of EMI/RFI will be below normal background levels.

1.04 SAFETY REQUIREMENTS

- A. To provide shock protection and prevent a “startle reaction”, current flow from any exposed emitter electrode to a grounding point shall not exceed 20 microamps.
- B. System will only use plastic enclosures with an FR2 or better fire rating.

1.05 RELIABILITY REQUIREMENTS

- A. The system as a whole must meet the following criteria:
 - 1. 10,000 hours mean time between failure.
 - 2. Two hours maximum time to repair.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Description: Ionization system equal to Ion Systems.
- B. Emitters: Equal to ION Model 5510. Emitter rod maximum length is 15-inches. Emitter points shall be silicon.
- C. Controllers: Equal to ION Model 5084e.
- D. Wiring shall be installed in channel of cleanroom ceiling.

PART 3 - SYSTEM CALIBRATION AND VERIFICATION

3.01 INSTALLATION

- A. Emitters shall be moved, added and deleted as needed to accommodate the process tool layout and to meet the system performance criteria.
- B. Where cabling cannot be inserted in the ceiling system, use raceway to attach the wiring to the ceiling. Cabling shall not cross underneath lighting systems.
- C. Mount emitters directly to ceiling channel with ultra clean, non-particulating hardware. Mount emitters with Duo-Lock fasteners or with stainless mounting plates designed for the ceiling system.

3.02 SYSTEM CALIBRATION

- A. Calibration Schedule

1. Each emitter will be monitored twice per year. One-sixth of the emitters will be monitored each month. Sample will be rotated so that every emitter is monitored once every six months.

B. Calibration Procedure

1. Emitter output (voltage swings) will be verified per Ion Systems recommendations using an ISI Model 210 Charged Plate Monitor or a Model 280 Charged Plate Monitor or equivalent. All monitoring equipment will be calibrated according to ISO 9000 standards.
2. Emitter discharge time shall be measured and adjusted to meet the criteria of section 1.3 C.
3. Airflow Readings- Where discharge time tests are performed, airflow readings (vertical and horizontal) will also be recorded using a hand-held anemometer.

3.03 SYSTEM AUDIT AND CLEAN

- A. Inspection Schedule: System audit will be performed on a quarterly basis. One-third of the system will be audited per month. Sample will be rotated so that all emitters are inspected once per quarter. Following is a summary of services provided during the audit:
- B. Clean Tips: As standard procedure, emitter tips will be cleaned during scheduled visits. Tips will be cleaned per Ion Systems' recommendations, using cleanroom-compatible 91% IPA cleaning ampoule, an extension wand, and an 8' stepladder.
- C. Audit Tip Condition: During cleaning, a visual inspection will be made for damaged tips.
- D. Controller Inspection: Each System Controller will be visually monitored for normal operation.
- E. Layout Evaluation: Emitter layout will be reviewed during audits. If necessary, written recommendations will be submitted detailing potential emitter relocation's/revisions.
- F. Surface Raceway & Cable Maintenance: Repair or replace as necessary to maintain proper appearance and operation.

3.04 DOCUMENTATION

- A. Certification reports: Formal Certification Reports, with detailed list of the dates and work performed, and test report data will be delivered within three weeks of completion. Test data shall include:
 1. Voltage Swings
 2. Discharge time

3. Airflow Readings
 4. Notation of non-compliant emitters or system components before and/or after calibration.
- B. Equipment Layout Drawings: The system layout drawings will be updated as required by modifications to the emitter locations.

END OF SECTION